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Dairy Products Consumption Prevalence in Northern Nigeria: A Study of Sokoto Metropolis

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Abstract:

This study analysed the consumption prevalence of dairy products in Sokoto metropolis. The metropolis was grouped into four clusters, namely; Sokoto main, GRAs, Resident community and Peri-urban whereby 160, 100, 90 and 150 respondents were respectively selected on a random basis. Data were collected using a food frequency questionnaire. Descriptive and chi-square statistics were used to analyse the data. The results showed that 76% of the respondents were Hausas while 69% had a tertiary education and 66% earned above NGN50, 000 per month. The analysis reveals that yoghurt was the most widely consumed dairy products while powdered milk was much more consumed than the evaporated milk. An analysis of the stated preferences of the respondents shows that there was no single dairy product which was overwhelmingly preferred by all the respondents. However, a chi-square analysis of the stated preferences of the respondents shows that ethnicity, education and income levels of the respondents were the major variables influencing the stated preferences of the respondents. Meanwhile, over 64% of the respondents sourced their dairy products from supermarkets and shops/kiosks. While a great proportion of sampled respondents (66.74%), cited health benefits as the main reason for their consumption of dairy product. From the results of this study, it can be concluded that dairy product consumption in Sokoto metropolis is widespread and that people are aware of the health benefits of dairy product consumption. Therefore, it is hereby recommended that promotions that emphasize the nutritional benefits of dairy products should be intensified so as to increase demand.

Keywords: Prevalence, Stated Preferences, Chi-square, Dairy products, Sokoto metropolis

1. Introduction

Oni and Fashogbon (2012) citing Omoyele (2011) noted that dairy products provide 15 essential nutrients for normal growth and development of the body, which, unfortunately are lacking in the normal staple being uptaken by most Nigerians. Consequently, it is believed that consumption of dairy products is especially important in Nigeria, where available statistics point to the need to promote increased consumption of high nutrient food substances among Nigerians, especially among children, of whom, 36% of those under the age of 5 years are reported to be underweight, 57% stunted, and 16% wasted (Phillip *et al.* 2013). The necessity for dairy product consumption was further underscored by Grace *et al.* (2008), as they observed that considering the importance of calcium in preventing bone deterioration, controlling high blood pressure, and reducing cancer risk, moderate daily consumption of dairy products is recommended even for those that may suffer from lactose intolerance.

Following Jabbar and Domenico (1990), consumption prevalence was defined as the proportion of households consuming a specific dairy product and was determined by asking the respondents if they consumed various dairy products. In Nigeria, many studies have indicated a high prevalence of dairy product consumption among the populace. For example, Jansen (1992) reported a 100% consumption prevalence for dairy products in northern Nigeria especially of the traditional types. Akinyosoye (2006), reported that all the dairy products (fresh milk, powdered milk, tinned milk and the others like ice cream, butter, cheese and yogurt) are consumed across Nigeria. However, average households in northern Nigeria consistently out-spend their southern counterparts on the locally processed dairy products such as fresh milk, sour milk, with the reverse being the case for processed dairy products such as powdered milk, tinned milk, ice cream, butter, cheese and yogurt.

Consumption preference studies can be classified into two; namely Revealed preference methods (RPM) and Stated preference methods (SPM). The former is being based on data obtained by direct observation or obtained in surveys asking for actual behavior, while the latter use individual respondents' statements about their preferences in a set of options to estimate utility functions (Kroes and Sheldon, 1988). Office of Management and Budget OMB (2003) observed that stated preference methods have been developed and used in the peer-reviewed literature to estimate both "use" and "non-use" values of goods and services especially those that are not easy to study through revealed preference methods. However, OMB (2003) noted that the main weakness of stated preference methods is that people may not necessarily do what they say. Similarly, Kroes *et al.*, (1986) noted that estimates of absolute demand levels derived using stated preference methods do require careful interpretation, since it is known that people generally do tend to overstate their responses under experimental conditions.

Rimal *et al.* (2008) observed that many studies have related consumers' health concerns to the consumption of foods containing dairy products and that the impact of nutritional information on demand for dairy products have indicated that consumer health and nutritional concerns have a significant effect on demand for dairy products. Furthermore, Anonymous (2010) reported that the nutritional value or the health benefits that the dairy products offer are the key influencing factors for consumers who purchase the product, regardless of the brand being purchased. However, considering the low consumption level of dairy products in Africa, King (2002) emphasis the importance of sensitizing the public to the nutritional benefits of milk compared with other beverages which are consumed by the poor. He noted further, that, there are also marketing/distribution problems in the formal sector which processes fresh milk. For example, 80% of milk is collected and sold by informal vendors who have lower costs and, according to producers and consumers, provide a better service even though they commonly adulterate milk with water and preservatives which might risk public health (King, 2002).

Despite the importance and widespread consumption of dairy product in Nigeria, notable studies on milk and milk product consumption in Nigeria has been few and dates back to early 1990s (Jabbar and Domenico, 1990; Jansen, 1992), with the most recent being that of Akinyosoye (2006). Consequently, limited knowledge is available regarding the present day consumption pattern of Nigerian consumers of dairy products. Most importantly, there is a dearth of previous study that have been carried out which analyzed the consumption prevalence, the sources and the reasons advance for consumption of dairy products among different households in Sokoto metropolis. This is a cause for concern considering that Sokoto state is one of the major livestock producing states in Nigeria (Mamman, 2005), it is expected, therefore, that, dairy product consumption will be much more prevalent among the populace. For these reasons, this study was embarked upon with the following specific objectives:

1. Determined the consumption prevalence of respondents with regards to dairy products in the metropolis
2. Analysed the stated preference of respondents with regards to dairy products in the metropolis
3. Compare the stated preference of respondents with their consumption prevalence
4. Test the relationship between the socio-economic characteristics of the respondents and their stated preferences for the consumption of dairy products in Sokoto metropolis
5. Identify the source as well as the reasons for dairy product consumption in the metropolis
 - Hypothesis

For the purpose of this study, the following null hypothesis was tested:

Ho: The stated preferences of household heads on the different types of dairy product are not affected by the socio-economic characteristics of the household head.

2. Material and Methods

2.1. Study Area

The study area is Sokoto metropolis, which lies between latitude 13° 04'N and longitude 5° 14'E and at an altitude of 272 m above sea level. The metropolis is in the dry Sahel surrounded by sandy terrain and isolated hills with an average annual rainfall of 550 mm starting in May-June and ending September-October. Except for the Harmattan period (November to February) which is characterized by a dry, cold and dusty condition, the temperature for the most part of the year is hot (Abdullahi *et al.* 2009). The metropolis is made up of Sokoto North and Sokoto South Local Government Areas (LG As) as well as parts of Bodinga, Dange-Shuni, Kware and Wamakko L G As with an estimated population of about 1,078,092 (NPC, 2012). The demographic structure of the metropolis is cosmopolitan albeit with the *Hausas* predominating, and Hausa is the common language. Occupation of the inhabitants includes trading, civil service while a reasonable proportion of the population works in organized private sectors (SOSG, 2012).

2.2. Sampling Procedure and Sample Size

A cluster sampling procedure was adopted for this study, whereby the metropolis was grouped into four homogenous clusters, namely; peri-urban, city centre, GRAs and the resident community. Although the calculated sample size for this study was 284 households, however, the sample size was expanded to 500 households. Thus, the breakdown showed that one hundred and fifty respondents were selected from the peri-urban cluster, one hundred and sixty respondent from the city centre, one hundred from the GRAs and ninety from the resident's community clusters respectively. Thus, the total sample size for the metropolis was five hundred respondents.

2.3. Analytical Techniques

Descriptive statistics mainly Tables and Figures were used to achieve objective 1, 2 and 3, while Chi-square analysis was used to achieve objective 4.

2.4. Chi Square Analysis

Chi-square analysis have been used extensively to test for the relationships between socio-economic characteristics and stated preferences. For example Dalhatu and Ala (2011) reported no significant differences between income and preference for fish. The data were analyzed using chi-square to test for a significant relationship between the socio-economic variables of the respondents and their stated consumption preferences of dairy products in the metropolis. Chi-square is specified as:

$$X^2 = \sum (O-E)^2 / E \quad (1)$$

Where:

X^2 = Chi- square;

Σ = Summation of;

O = Observed value of variable; and

E = Expected value of variable

2.5. Data Collection

The primary data for this study was collected from June–October 2013 using a pre-tested structured food frequency questionnaires (FFQ) administered by the researcher and assisted by trained enumerators to elicit information from the respondents. Meanwhile, the household was adopted as the unit of investigation and was defined, following NPC (2012) definition, as consisting of a family who live together and take at least one meal a day together and had a recognized head of authority. Information was obtained mainly from the household heads and in some cases the household food budget manager (FBM).

3. Results and Discussions

3.1. Personal Characteristics

Age, sex, household size, level of education and monthly income level of the household heads were the personal characteristics that were evaluated and the results are presented in Table 1. The result shows that a greater percentage of the respondent households were headed by middle-aged people with the mean age being 39. While over 85% of the surveyed household were headed by males. The average household size of 7.8 reported in this study was slightly lower than the national average of 8 but higher than the 5.0 reported for Sokoto State by NBS (2010). The results showed a high level of educational achievement recorded with over 50% of the respondents having attained one level of tertiary education or another. Similarly, 66% of the respondents were middle to high income earners. Erhabor and Ojogho (2011) as well as Emodi and Madukwe (2011) reported similar findings and observed that high income and educational attainment of respondents are some of the features associated with household demand studies set in urban areas.

	Frequency	Percentage
Age (year)		
18---25	44	8.80
26—35	189	37.80
36---45	134	26.80
46--55	84	16.80
>55	49	9.80
Mean	39.298	
Sex		
Female	73	14.60
Male	427	85.40
Household sizes		
1—5	204	40.80
6—10	169	33.80
11—15	83	16.60
16—20	19	3.80
>20	25	5.00
Mean	7.772	
Educational qualification		
None	40	8.00
Primary	47	9.40
Secondary	63	12.60

NCE/OND	84	16.80
First degree/HND	183	36.60
Postgraduate	83	16.60
Income levels per month		
Less than NGN50,000	169	33.80
NGN50,000--100,000	231	46.20
Above NGN100,000	100	20.00

Table 1: Socioeconomic characteristics of the respondents (n=500)

Source: Field Survey, 2013.

3.2. Consumption Prevalence of Dairy Products in Sokoto Metropolis

Table 2 showed the consumption prevalence for the metropolis. The table showed that yoghurt was the most widely consumed dairy products in Sokoto metropolis with more than 60% of the respondents reporting the consumption of the product. Another widely consumed dairy product were the locally produced *Nono* and *Manshanu* (Ghee) with the former being consumed by more than half of all the respondents (57.60 %) and the latter by one third of the surveyed households (36%). Powdered milk is much more consumed (42%) than the Evaporated milk (22%) which may not be unconnected to the fact that unlike evaporated milk, powdered milk come in different sizes and prices thus being affordable to almost all categories of buyers (Anon, 2010). Flavored milk was a widely consumed dairy product consumed by 41% of the households. Another widely consumed dairy product is ice cream, which was consumed by a third (37%) of the households. Some of the less popular dairy products were fresh milk and baby formulae which were consumed by less than a quarter of all respondents (Table 2). This was not surprising considering that fresh milk and baby formulae were mostly associated with special categories of consumers, that is infants and health conscious consumers. For example, considering the tasteless nature of fresh milk, it was not very popular with children and young adults and was therefore mostly uptake by the health conscious household adults.

Dairy products	Frequency*	Percentage
Baby formulae	66	13.20
Evaporated milk	110	22.00
Flavored milk	209	41.80
Fresh milk/UHT	105	21.00
Ice cream	188	37.60
<i>Manshanu</i>	180	36.00
<i>Nono</i>	288	57.60
Powdered milk	210	42.00
Yoghurt	302	60.40

Table 2: Consumption prevalence of dairy products in Sokoto metropolis (n=500)

Source: field survey, 2013

* Multiple responses were recorded.

3.3. Stated Preferences Structure of Dairy Products in Sokoto Metropolis

The stated preference method used in this study is the traditional methods in which the respondents were provided with a list of commonly consumed dairy products in the metropolis and were asked to rank in descending order the dairy products in order of preferences. The results are shown in Figure 1. It shows that 28.35% of the respondents chose the traditionally produced *Nono* (fermented milk) as their number one preferred dairy product; this is followed by powdered milk (19.20%), yoghurt (18.53%), fresh milk (16.74%), evaporated milk (16.74%), ice cream (7.59%) and finally flavored milk (4.69%). Therefore, the results show that there was no single dairy product which was overwhelmingly preferred by all the respondents. However, a clear pattern can be discerned whereby the products can be grouped into two broad classes; those which were generally popular and those whose popularity was generally low. Among the first group were *Nono* (fermented milk), powdered milk, yoghurt, fresh milk and evaporated milk with more than 15% of the respondents choosing them as their number one preferred dairy products. In the second category were ice cream, *Manshanu*, and flavored milk each with less than 10% of the respondents choosing them as their number one preferred dairy products.

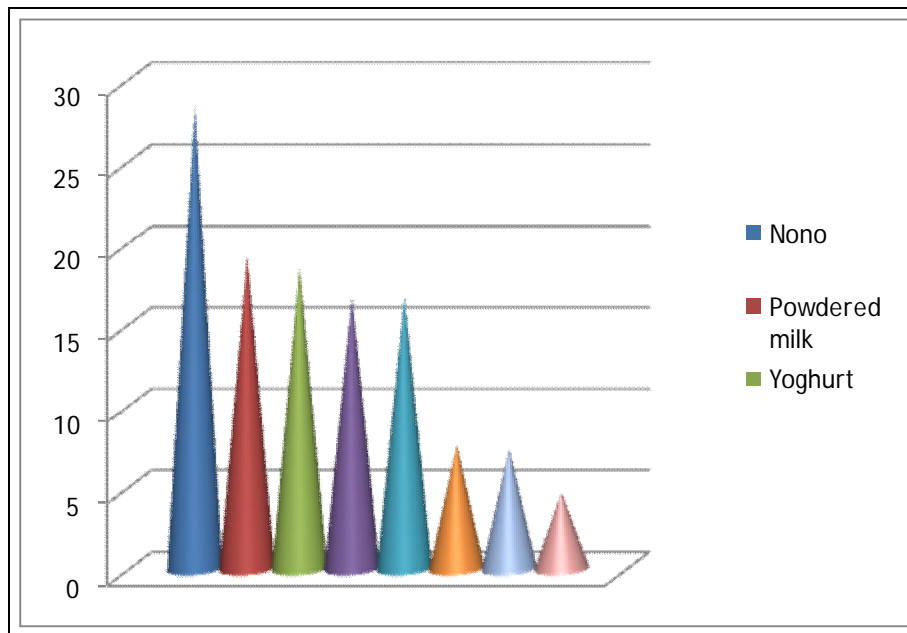


Figure 1: Stated preference structure for the various dairy products in the metropolis.

The high popularity of fermented milk (*Nono*) was, however, as a result of the fact that most of the respondents from the peri-urban cluster chose it as their number one preferred dairy product. In other words, the preference for *Nono* does not cut across all locations or socio-economic strata. Similar findings were also obtained by Njarui *et al.* (2011), where they reported the popularity of fermented milk to be very high, but, cautioned that this may be because fermented milk is considered to be part of the cultural practice among the inhabitants of the study area particularly in rural areas. Another very popular dairy products were powdered milk and evaporated milk. Mainly uses as ingredients in the preparation of food, these two products were widely used in all the locations and across the socio-economic strata.

Alternatively, when the respondents were asked to name their second most preferred dairy product, yogurt product comes top with over 17% choosing it as their second most preferred dairy product. Yogurt also comes first as the third most preferred dairy product with 16% choosing it as their third most preferred dairy product. Interestingly, the preference for a yogurt, cut across all locations and status. It is safe to conclude, therefore, that apart from being the most widely consumed dairy products in the metropolis, yogurt was also the most widely preferred dairy products in the metropolis.

3.4. Comparison between the Stated Preference of the Respondents and their Actual Behavior

Mullins (1992) while comparing consumer preferences with actual consumer behavior reveals that the two patterns may not coincide. In other words, the households may not consume their preferred dairy products, but rather may be forced to choose among whatever products the market offered or was affordable by them. This was exemplified by Belewu *et al.* (2009) study, whereby, although the respondents purchased more powdered milk than evaporated milk, the consumer's preference responses revealed that evaporated milk was more favored than powdered milk. But because powdered milk was relatively cheaper than evaporated milk the consumption of the latter was more prevalent.

Comparing the consumption prevalence of the respondents (Table 2) and their stated preferences (Figure 1), the results showed that the respondents were in some cases not consuming their preferred dairy product. This was much glaring in the case of flavored milk where the consumption prevalence was 41.80%, but, less than 5% of the respondents indicated flavored milk as their number one dairy product. Furthermore, the stated preferences showed that *Nono* (fermented milk) was the number one preferred dairy product while yoghurt was the third most preferred dairy product. However, the consumption prevalence showed that yoghurt was consumed above *Nono*. This disequilibrium between the stated preference and the consumption prevalence may be partly explained by the fact that some dairy product were consumed not by the household head, but by some family members within the household. Consequently, the opinion of the household head on the dairy product in question may be low, but the consumption level of the product was still high within the household. This was mostly the case for such dairy products as baby formulae, flavored milk and ice cream.

3.5. Chi-square Analysis of the Stated Preferences of Dairy Products Consumers

The chi-square analysis of the stated preferences of the respondents shows that educational level and economic status of the respondents were the major factors influencing the preferences of the respondents. The two variables were significant in the preferences of the respondents with regards to *Nono*, *Manshanu*, fresh milk, powdered milk, yoghurt and flavored milk. Meanwhile, the ethnicity of the household heads was another variable that influence the preferences of the respondents in the consumption of *Nono*, *Manshanu* and fresh milk, while marital status significantly influence the preference structure for powdered milk, yoghurt and flavored milk. Finally, age, sex and household sizes were significant only in the preferences for evaporated milk, yoghurt and ice

cream respectively (Table 3). The decision rule in each case was to reject the null hypothesis and accept the alternative hypothesis that there is a significant relationship between these variables and the stated preference of the corresponding product (Table 3).

	Variables	Df	Value	Prob.	Decision
Age	<i>Nono</i>	459	375.4469	0.998	Accept the H_0
	<i>Manshanu</i>	408	400.5060	0.595	Accept the H_0
	Fresh milk	376	376.0060	0.490	Accept the H_0
	Evaporated	414	497.4458	0.003***	Reject the H_0
	Powdered	329	296.9727	0.897	Accept the H_0
	Yoghurt	441	460.9796	0.247	Accept the H_0
	Flavored milk	329	321.7324	0.602	Accept the H_0
Sex	Ice cream	405	401.9631	0.533	Accept the H_0
	<i>Nono</i>	9	27.8979	0.001***	Reject the H_0
	<i>Manshanu</i>	8	8.3176	0.403	Accept the H_0
	Fresh milk	8	19.0841	0.014**	Reject the H_0
	Evaporated	9	15.9958	0.067*	Reject the H_0
	Powdered	7	3.6062	0.824	Accept the H_0
	Yoghurt	9	15.6767	0.074*	Reject the H_0
Marital status	Flavored milk	7	7.5027	0.378	Accept the H_0
	Ice cream	9	8.2608	0.508	Accept the H_0
	<i>Nono</i>	18	20.1666	0.324	Accept the H_0
	<i>Manshanu</i>	16	22.4543	0.129	Accept the H_0
	Fresh milk	16	12.3472	0.720	Accept the H_0
	Evaporated	18	11.4092	0.876	Accept the H_0
	Powdered	14	37.3835	0.001***	Reject the H_0
Ethnicity	Yoghurt	18	28.6835	0.052*	Reject the H_0
	Flavored milk	14	22.5120	0.069*	Reject the H_0
	Ice cream	18	15.5064	0.627	Accept the H_0
	<i>Nono</i>	9	69.5104	0.000***	Reject the H_0
	<i>Manshanu</i>	8	25.1989	0.001***	Reject the H_0
	Fresh milk	8	27.2144	0.001***	Reject the H_0
	Evaporated	9	13.4840	0.142	Accept the H_0
Education	Powdered	7	4.6137	0.707	Accept the H_0
	Yoghurt	9	13.2540	0.151	Accept the H_0
	Flavored milk	7	7.2117	0.407	Accept the H_0
	Ice cream	9	8.9007	0.446	Accept the H_0
	<i>Nono</i>	45	103.2476	0.000***	Reject the H_0
	<i>Manshanu</i>	40	117.7162	0.000***	Reject the H_0
	Fresh milk	40	57.5319	0.036**	Reject the H_0
Income Level	Evaporated	45	50.4889	0.266	Accept the H_0
	Powdered	35	58.5895	0.007***	Reject the H_0
	Yoghurt	45	67.4567	0.017**	Reject the H_0
	Flavored milk	35	53.8246	0.022**	Reject the H_0
	Ice cream	45	45.7390	0.441	Accept the H_0
	<i>Nono</i>	18	70.2366	0.000***	Reject the H_0
	<i>Manshanu</i>	16	80.4541	0.000***	Reject the H_0
Income Level	Fresh milk	16	27.1123	0.040**	Reject the H_0
	Evaporated	18	22.1541	0.225	Accept the H_0
	Powdered	14	24.1694	0.044**	Reject the H_0
	Yoghurt	18	36.0696	0.007***	Reject the H_0
	Flavored milk	14	25.7083	0.028**	Reject the H_0
	Ice cream	18	21.3008	0.265	Accept the H_0

Table 3: Chi-Square Test of relationship between the socio-economic characteristics of the respondents and their stated preferences for dairy products

Source: computed from field survey data, 2013

***= $P < 0.01$ **= $P < 0.05$ *= $P < 0.10$

3.6. Sources of Dairy Products in Sokoto Metropolis

Sources of dairy products refer to the various ways and means by which the respondents acquired dairy products. Figure 2 shows the different sources by which respondents acquired dairy products in the metropolis. Six possible sources were identified, namely; own production, gifts, shops/kiosks, supermarket and roadside vendors. Of these, the most common were supermarkets, shops/kiosks and roadside vendors through which over 90% of the respondents sourced their dairy products. Specifically, about one third (34.82%) of the respondents purchased dairy products from the Supermarket, followed by those who purchased from shops/kiosks (30.8%) and roadside vendors (25%). The least important source of dairy products in the metropolis were own production and gift with each having less than 1% of the respondents indicating them as their sources of dairy products during the study period.

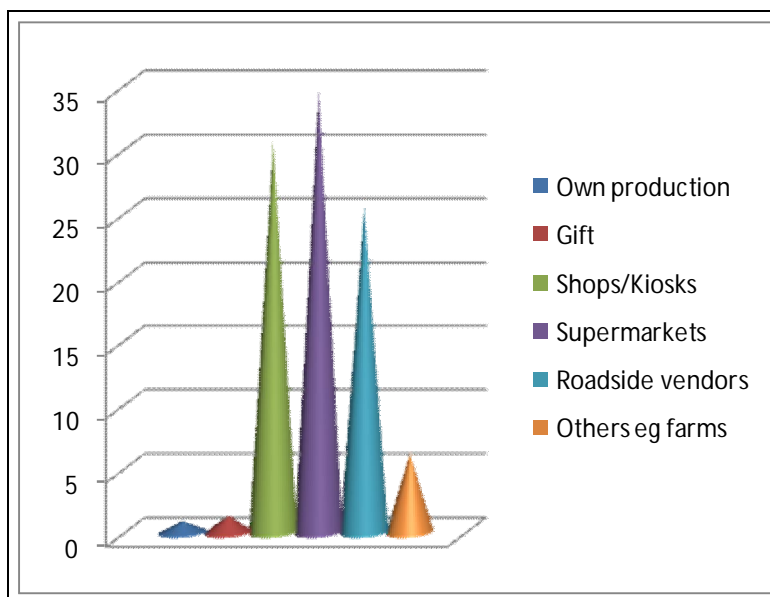


Figure 2: Sources of dairy products in Sokoto metropolis

In a similar dairy product consumption study, Sissoko *et al.* (1990) noted that although acquisitions of dairy products include purchases, gifts and own production, acquisitions through gifts and own production were negligible. Also, Mbogoh (1990) reported that in 90% of the cases, the household reportedly purchased their dairy products while the rest were acquired through own-production and as gifts.

However, it should be noted that most respondents used more than one source in the acquisition of their dairy products. One of the reasons for this is that some dairy products were generally available from a particular source only, as such its consumers must use that channel irrespective of whether it was their normal source of dairy products. For example, *Nono* was mostly sold at the roadsides generally by the Fulani women, while ice cream by its nature, was almost unavailable outside the supermarkets. This is in line with the report by Fuller *et al.* (2004) as they observed that distribution channels matter a lot in the acquisition of dairy product, and that certain dairy products tend to flow through particular marketing venues, but not through others, while in some cases, there is more than one main marketing channel.

3.7. Reasons for Consumption of Dairy Products in Sokoto Metropolis

Ma and Jones (2004) observed that taste, availability, convenience, habit and thirst were some of the major reasons that people uptake beverages. Figure 3 indicates the various reasons advanced by the respondents for the consumption of dairy products during the study period. Reasons given were health benefits, convenience, taste, as fast food and for children. However, these reasons were not mutually exclusive, in that many respondents advance more than one reason for their acquisition of dairy products.

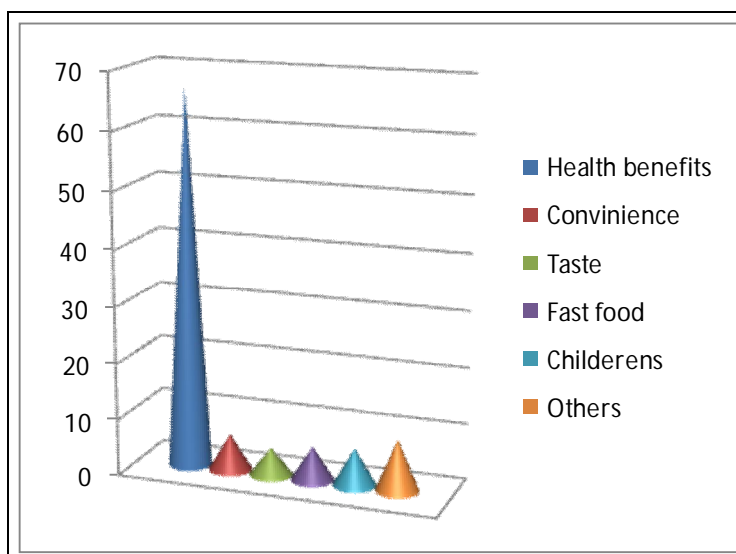


Figure 3: Reasons for the consumption of dairy products in Sokoto metropolis

A great proportion of sampled respondents (66.74%), cited health benefits as the main reason for dairy product consumption. Other main reasons given in decreasing magnitude were children (6.7%), convenience (6.47%), fast food (6%) and taste (4.91%). The perception of dairy product as a health drink was also reported by Luciano *et al.* (2004) as they observed that the overwhelming majority of respondents (92%) considered dairy products as a health drink. Akinyosoye (2006) also noted that the demand for dairy products in Nigeria, is principally based on the perceived health benefits for adults, pregnant mothers, babies and children.

3.8. Conclusion and Recommendation

From the results of this study, it can be concluded that dairy product consumption prevalence in Sokoto metropolis is widespread with 100% of the respondents reported consuming one dairy product or another. Yoghurt was the most widely consumed dairy products closely followed by the traditionally produced fermented milk. The stated preference analysis of the respondents shows that fermented milk was the number one preferred dairy product followed by powdered milk and yoghurt in third. However, by comparing the consumption prevalence of the respondents and their stated preferences, the results showed that the respondents were in some cases not consuming their preferred dairy product. Meanwhile, over 64% of the respondents sourced their dairy products from supermarkets and shops/kiosks. While a great proportion of sampled respondents (66.74%), cited health benefits as the main reason for their consumption of dairy product. Finally, considering the nutritional benefits of dairy products, it is hereby recommended that promotions that emphasize the nutritional benefits of dairy products should be intensified so as to increase demand for dairy products.

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